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16. Abstract (MAXIMUM 200 WORDS)

Crew members aboard deep draft vessels traditionally endure harsh working conditions, extreme temperatures, long work hours, frequent separation from loved ones, and fatigue. While a ship's endurance is determined by how long it can support operations at sea without replenishing supplies or requiring in-port maintenance, its crew members' endurance is determined by their ability to cope with job related physiological, psychological, and environmental challenges. Uncontrolled stress factors reduce mental and physical endurance and demand more concentration on the immediate task at hand. Crew members forfeit advanced planning and the ability to anticipate safety risks. Safety deteriorates as a crew becomes more reactive. Controlling these decrements in performance is critical to productivity and safety. This Guide is designed as a resource for captains, department heads, and officers, as well as company safety and operations managers in the shipping industry to control crew endurance risk factors such as stress, fatigue, sleep deprivation, and problems resulting from working and living on deep draft vessels. Section I introduces the concept of crew endurance management. Section II provides specific guidance on how to recognize endurance risk factors and the detrimental effects of psychological, physiological, and environmental stress factors. Specific recommendations are provided as to how to effectively address crew endurance risk factors. Section III provides specific guidelines on how to assess crew endurance and implement improvements in crew management practices. The principles provided in this Guide have been tested in a variety of maritime environments, including marine shipping companies, towing vessel companies, U.S. Coast Guard cutters, small boat stations, and aviation units.

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EXECUTIVE SUMMARY

In all occupations, mental and physical stressors impact workers' ability to concentrate on job related tasks. In the maritime environment, planning ahead for the next task allows crew members to anticipate risks that may compromise shipboard and operational safety. If stressors are not controlled proactively, crew members' mental and physical endurance degrade as task completion requires more effort and attention. Inevitably, crew members experience frequent lapses of attention that ultimately set the stage for the occurrence of errors in job performance. In brief, work related stressors are endurance risk factors that must be controlled to prevent compromising shipboard safety.

The Crew Endurance Management (CEM) practices proposed in this Guide compile field-tested methods used to manage risk factors that affect crew members' health and performance. The CEM principles refer to the concept of endurance management, rather than sleep or fatigue management, because in maritime environments a variety of stressors, not solely sleep loss, have a direct impact on crew performance. In this context, the term **endurance** refers to the ability to maintain performance within safety limits and to control the adverse effects of environmental, physiological, and psychological stressors.

This document emphasizes that the control of endurance risk factors is critical to both productivity and safety. With this in mind, the contents of this Guide are intended to aid the professional mariner in the constant struggle to control crew endurance risk factors aboard deep draft vessels. Section I takes the reader directly into the practice of CEM. Section II provides practical recommendations for the control of specific endurance risk factors such as extreme environmental temperatures, work related stress, unpredictable work schedules, sleep loss, fatigue, etc. Section III guides the reader on how to design, implement, and test CEM plans aboard deep draft vessels.